

# Digital Government Strategic Framework 2019-2024

January 2019

Kingdom of Tonga

The 2019-2024 Tonga Digital Government Strategic Framework

*"Building A More Progressive Tonga Supporting Higher Quality of Life for All"*



# DIGITAL GOVERNMENT STRATEGIC FRAMEWORK

## 2019-2024

### KINGDOM OF TONGA

We are pleased to present the of Kingdom Tonga's Digital Government Strategic Framework (DGSF) for 2019-2014. The DGSF outlines Tonga's long-term vision to institute and establish the Government as an innovative, enabling, and a responsive 21<sup>st</sup> century Government.

Technology has changed the way people communicate, work, and interact. Whether it is through access to Government services via the internet, interactions via social media and mobile technologies, or receiving aid when requested, technology is being employed as an enabler to build and to strengthen services delivery. The DGSF vision is to create a responsive and robust Government's decision making through change management focused on improving the efficiency and effectiveness of Government services thus enabling a competitive business environment and to create sustainable development opportunities for the people of Tonga.

This vision is at the core of the DGSF. The people of Tonga have entrusted the Government to create efficiency through an integrated digital government that is responsive and has clarity of public services (such as in licensing, registration or taxes and duty), and ensuring the integrity of information, data sources and system management. The DGSF focuses on providing enabling environment and technology and governance through change management tools to help make Government more efficient, agile and accessible.

The framework's goals and objectives are challenging. Considerable attention is given to the need for improving technology and information systems governance knowledge, developing and adopting principles, policies, and frameworks needed to guide our information systems and Digital Government planning, and measuring our success in attaining desired outcomes from DGSF objectives.

Attaining those objectives will combine resources from within the Government, through collaboration with development partners such as international and bilateral organizations, partnering and outsourcing relationships with the private sector to accelerate technology and knowledge transfer to Tonga, and collaboration with other international Governments.

We tasked Government leaders, agencies and their employees and the people of Tonga to participate, contribute, and share ideas to ensure all goals and objectives of the DGSF are achieved, exceeded, and serve as the catalyst for change management at the national, districts and community levels and across public enterprises and sectors.

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**Hon. Dr. Pohiva Tu'i'onetoa**  
Minister of Finance and National Planning





## INTRODUCTION

The Tonga Digital Government Strategic Framework 2019 – 2024 sets the directions for the Government's use of Information and Communication Technologies (ICT) or digital technologies, with the ultimate intent of improving Government decision making, business process and workflow efficiencies, improving the quality and timeliness of services for people of Tonga, while reducing the complexity and cost of Government services.

The Digital Government Strategic Framework promotes the use of ICT within Government ministries and agencies. That promotion includes an aggressive transition from paper-based transactions to digital Government. As Government data and information is transitioned to a digital format Tonga will benefit from a new, modern model of ICT delivery for all agencies. This framework will enable a far more integrated, shared, accurate, timely, and inclusive information flow within and across all Government agencies.

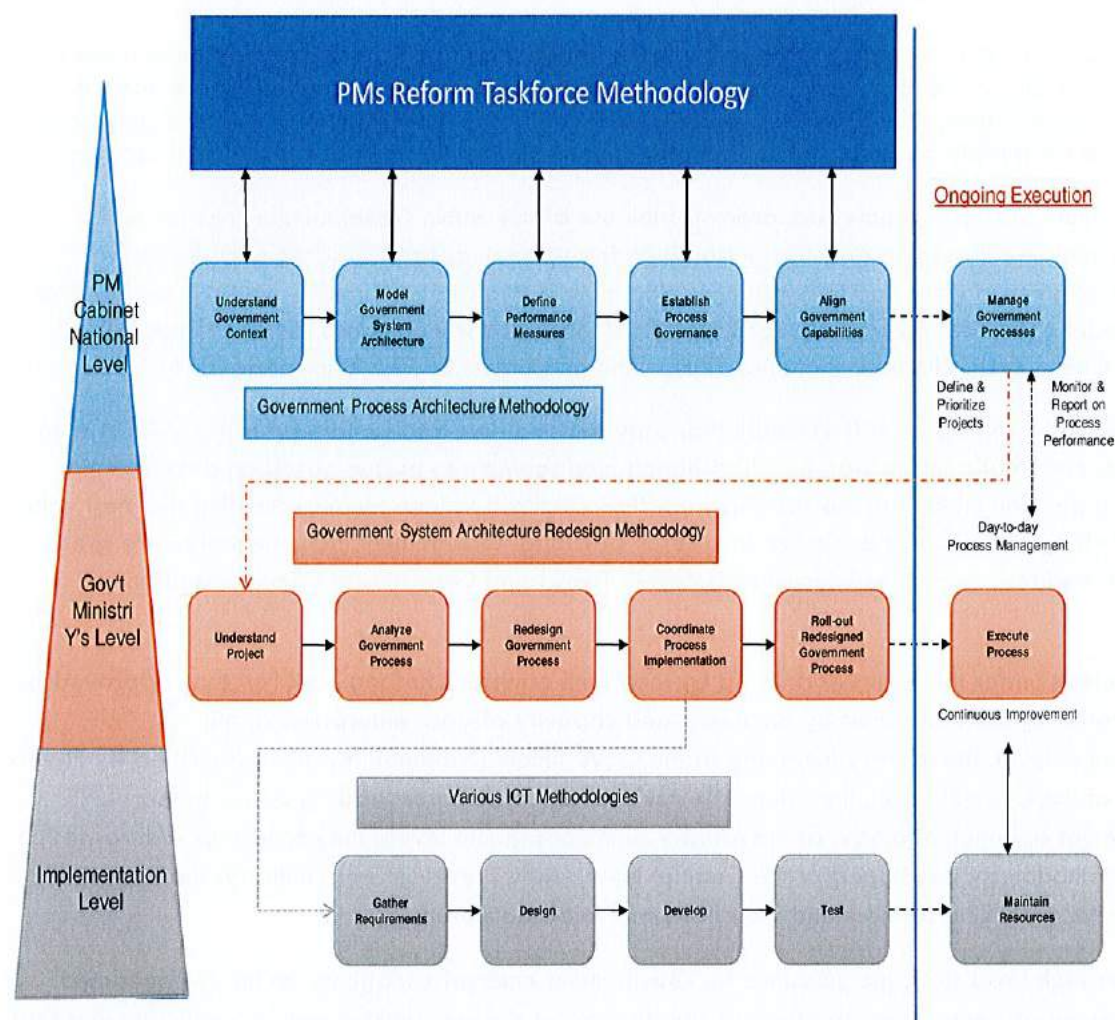
Digital Government, as a concept, is a framework that provides strategic goals and supporting objectives to guide Government, and Public Enterprises, on what change management to pursue based on current legislations and the decision making processes and work flow required to improve thus creating the most value from investments in ICT. The outcome expected as a result of Digital Government implementation are great benefits to citizens, business, as well as interaction between Tonga and Government agencies and among agencies.

The DGSF and projects under this framework is led by the Prime Minister's Reform Task Force as approved by Cabinet<sup>i</sup> in an iterative process informed by the needs and capacity of each enterprises at the divisional/department level, the ministry level and at the Government (National) level as prescribed by Figure 1 below. Where at the Cabinet Level, the Prime Minister's Reform Task Force leads in defining new Government processes and methodology, at the ministry and department levels, they follow up with re-design to align with the methodology developed at the Cabinet level. At ICT level (of each ministry) the execution of ICT methodologies to streamline services and workflows are to be delivered.

The DGSF provides high level strategic guidance for Government enterprises/agency on how to build and strengthen Government processes and workflows firstly, to support decision making and secondly, in ways that contribute to the sustainable development of the people of Tonga. Part of the high-level strategic guidance provided through the DGCF is expressed in the form of a system approach driven by a change management.

Security of physical ICT infrastructure, protection of personal and privacy information, and protection of national critical data are fundamental to all Digital Government strategic goals. The digital government security requirements follow several security principals including protection of confidential information, ensuring the integrity of data and information, and ensuring accessibility of information to those with a valid need-to-know and proper security authentication and authorization.

Figure 1: The Institutional Arrangement for the DGSF - PM's Reform Task Force<sup>ii</sup>



The Digital Government strategic framework is also closely aligned with the Tonga Strategic Development Framework (TSDF). No Digital Government or ICT plan would be effective if not supporting a top level national strategy. The TSDF provides guidance in the form of eight National Outcomes intended to drive “inclusive and sustainable development,” and 5 strategic pillars supported by 29 organizational outcomes.

Tonga's DGSF has five strategic goals which are designed to fulfill the requirements of all TSDF National Outcomes and Organizational Outcomes.

While the scope of the DGSF is five years, it is expected the DGSF will be reviewed, and updated annually as needed to ensure the DGSF is current with new, emerging or changed technologies, organizations, and opportunities.

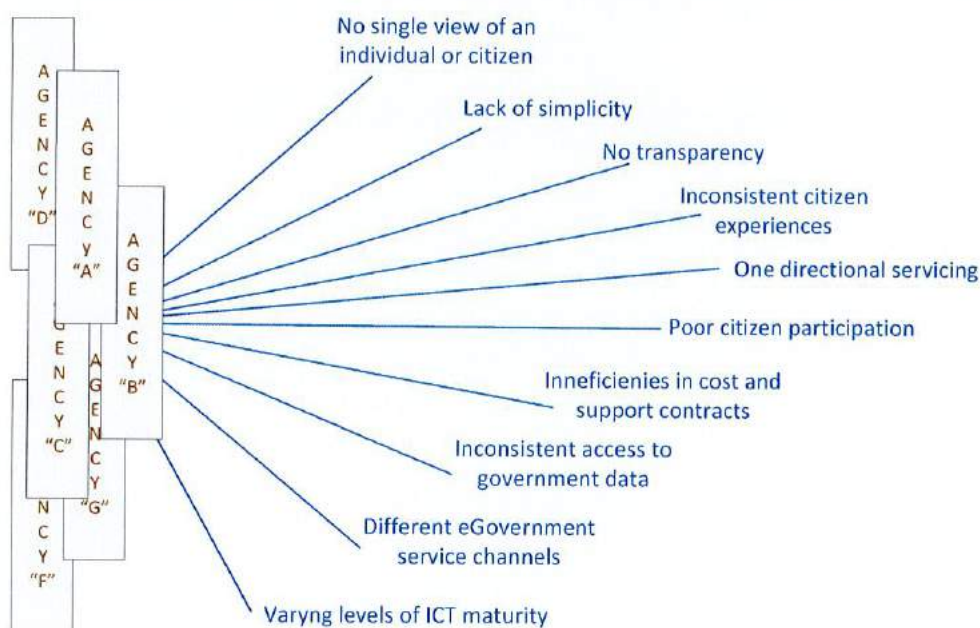


## EXISTING DIGITAL CAPABILITY

While Government ministries and agencies in Tonga have successfully developed supporting information systems to enable their individual business units, there are challenges with integration of information and data sets for decision making, decision makers accessing these information, weak coordination, sharing of information across agencies and managing multiple, incompatible information systems. Without integration of information systems, it is difficult to see the 'whole picture' with its contributing components thus decision making is not fully informed. In addition, facilitating a "one stop" lifecycle processes and records access for the public and business is also a challenge.

Today, many Government agencies work independently, resulting in data systems and information which are potentially needed by other agencies, or external systems supporting business and citizen services. The result is often duplicated data which does not follow a standard format, manual transfers of data requiring human intervention, loss of data, and other vulnerabilities as indicated in Figure 2 below.

**Figure 2 The Issues with the Existing Decision Making Processes and Service Delivery**



This DGSF intends to guide the Government of Tonga in addressing and eliminating these existing challenges through the use of information and communication technologies (ICTs) to build, strengthen and streamline Government's delivery of services and decision making processes and workflow. The DGSF is to involve all Government enterprises (agencies/sectors) and all stakeholders from different sectors, organisation types and governance levels.

A Digital Government processes and workflow are cross-cutting, actions must take place at all enterprises level, for example through targeted agencies or multi-agencies programs which deliver concrete results for the peoples of Tonga. The interlinking roles of agencies (including central agencies, health, education, water and sanitation, social assistance, energy, agriculture, fisheries, forestry, culture, tourism, mining, environment, trade, transport and infrastructure etc) are recognised as components of the digital government strategic framework. The DGSF guidance are to be implemented as relevant to the respective priorities and needs of agencies/enterprises and stakeholders. Some actions may be better implemented at the ministry/department level and some would need to be further articulated at the business, private sector or community level to suit the specific context, priorities and needs of each individual.



## THE DIGITAL GOVERNMENT STRATEGY FRAMEWORK

From the existing Government ICT capability to where Tonga would like to achieve in terms of building ICT capability for the whole of Government, businesses and for the people of Tonga, this strategy is contributing to the achievement of the TSDP which providing a specific vision, outlines the principles that would be upheld, and presents strategic goals to guide integrated and sustainable digital development and key objects to be implemented through the change management approach endorsed by the Prime Minister's Reform Task Force and the Government Enterprise Architecture Framework (GEAF).

## DIGITAL GOVERNMENT VISION

Digital Government brings together the innovation and enabling aspects of technology with the business and life needs of citizens, business, and Government. The Tonga Digital Government Strategic Framework, 2019-2024, provides a vision and strategic guidance for building a sustainable and efficient digital Government to accomplish Strategic Objectives established within the Tonga Strategic Development Framework (TSDF).

*The TSDF Vision: "A more progressive Tonga supporting higher quality of life for all"*

The TSDF identifies seven key National Outcomes, for which the Digital Government Strategic Plan will provide six goals and supporting objectives to help fulfill those outcomes. The key National Outcomes include:

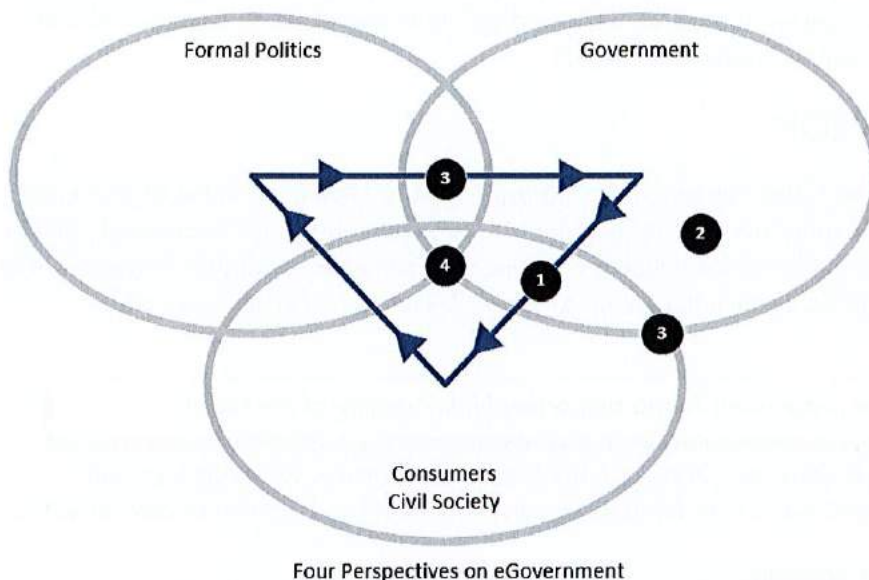
1. A dynamic knowledge-based economy
2. Balanced urban & rural development across the country
3. Empowering human development with gender equality
4. Responsive, good governance with strengthened rule of law
5. Successful provision and maintenance of infrastructure and information technology (IT)
6. Effective land and environment management, with resilience to climate and risk
7. Consistent advancement of our external interests and security

The Digital Government Strategic Framework (DGSF) will also support our unique cultural and traditional Tongan values, which highlighted in the TSDF, are considered and aligned with DGSF driving principles, while ensuring all Digital Government programs and goals encourage innovative and enabling solutions (also refer

### **The DGSF Vision:**

*"Digital Government in Tonga is dedicated to creating a responsive and robust Government's decision making through change management focused on improving the efficiency and effectiveness of Government services thus enabling a competitive business environment and to create sustainable development opportunities for the people of Tonga."*

Attachment A). Government's function is to serve the public through improving services provided to the people of Tonga. Digital Government combines technologies (ICT hardware and software), data (accuracy and timely), capacity (human resources and skills), and sustainable development (change management, governance, policies and regulatory frameworks, guidelines, code of practice etc.,) with business process and work flow improvements to facilitate the delivery of these services.



Individual Strategic Goals, such as developing Digital Government, and principles such as Designing for Data Sharing, are intended to help each agency become customer and service focused, efficient, process driven, and produce measurable outcomes. Implementation of the DGSF must focus on improving agency processes, and then connecting to the agency's internal and external stakeholders through automated and demand-driven services.

The DGSF aligns Government agency resources, including vision, business, processes, data, applications, technical infrastructure, and human capabilities to improve the quality of Government and citizen services by reengineering and simplifying business process, streamlining Government operations, and adopting a standard Enterprise Architecture Framework.

In the above chart, "Four Perspective on Digital Government,<sup>iii</sup>" relationships between the Government, Government leadership, and consumers of Digital Government services are shown. The outcome of the above chart would be a Digital Government Framework and Reference Architecture providing direction to develop information systems and data architectures which directly support eServices, as well as providing a context for transforming public administration through the use of digital technologies.

The relations above, which provide a basis for a Digital Government framework, are categorized as:

- Government-to-Government (G2G). G2G refers to the interactions within and between Government agencies. G2G is dependent on the strategic goal of data and information sharing protocols and development of a service-oriented information systems architecture.



- Government-to-Business (G2B). G2B refers to the stream lining of selected processes and workflows to enable efficient and effective performance of both businesses and Government.
- Government to Public/People (G2P). G2P refers to the stream lining and efficiency of selected Government processes and workflows that provide public services as a routine part of interacting with Government.
- Government-to-Employees (G2E). G2E refers to Government interactions with Government employees, administration, payrolls, human resources, and employment status.

Digital Government relies on implementation of Government processes workflows which are based on a digital representation of information and data formerly based on paper or using predominantly manual processes. Digital Government facilitates the automation of processes, including the interconnections and sharing of data and information between Ministries and agencies.

The most important outcome will be the efficiency of automated workflows and processes supporting all four categories of Digital Government.

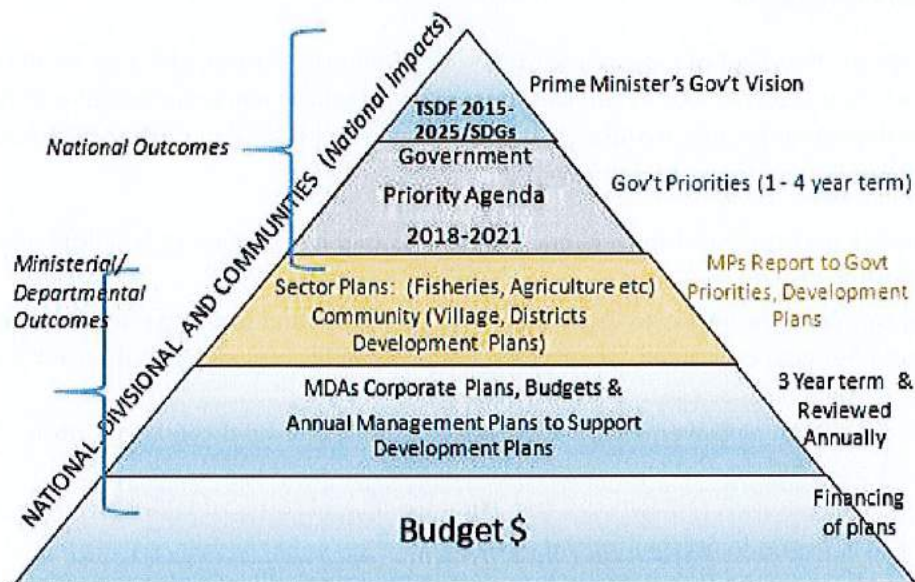
From the business perspective, Digital Government is a way of introducing new channels of interaction between Government and consumers of its services, to make interactions more convenient and simple to consumers, and less expensive for the provider of services. Successful adoption of Digital Government<sup>iv</sup>, results in several business benefits, including the following:

- Enabling timely access of decision makers to key data and information to facilitate informed and evidence based decision making
- Facilitating appropriate access to Government data, information and processes to all categories of Government eServices consumers, whether the general public, business, Government agencies, Government employees, or even other Government:
  - Access to Digital Government services can be provided on a continuous basis, 24x7x365 days per year.
  - eServices access is typically cheaper than traditional forms of interaction (e.g., requiring physical access in person) for the consumers.
  - The access can be made simple by automating potentially complex workflows and process, including navigating organizational complexities.
- Improving operational characteristics of Government processes, including the following:
  - Decreasing the cost (in terms of time and input (paper and prints)) to Government of providing quality services to their consumers.
  - Decreasing the load on Government workers by automating and extending Government business processes directly to eService consumers.
  - The reach of Digital Government services can be widened from initialized specialized groups to all consumers that have a need, and a right, to use the service without incurring substantial costs.

The institutional arrangements provided by the Prime Minister's Reform Task Force also established a Government Enterprise Architecture Framework (GEAF), (refer to Figure 3 below). which is being by this DGSF. The use of a GEAF within Tonga's Digital Government Strategic Framework has the following benefits:

- Improves alignment of information technology with the Government's missions, goals, and objectives.
- Improves nationwide service delivery and business operations.
- Improves security, reliability and performance of the Government's information technology infrastructure.
- Improves nationwide data/information sharing and systems interoperability.
- Allows more effective use of Government resources enabling consistent, effective and efficient delivery of eServices to all Government employees, people/communities, and businesses.
- Improves Government-wide information systems and data integration reducing duplicate physical data systems infrastructure, information silos, and both data and application redundancy.

**Figure 3: Government of Tonga, Enterprise Architecture Framework (GEAF)**



The common denominator for achieving the intended outcomes of the digital government is people. The digital government will impact how individual people do their work: their processes, job roles, workflows, reporting structures, behaviors and even their identity within the organization. Change management is the approach to driving adoption and usage so the digital government initiatives deliver expected results and outcomes. Here is why change management is important to lead in the implementation of the DGSF through projects (refer Figure 4 below).





This change management means defining and adopting corporate strategies, structures, procedures, and technologies to deal with change stemming from digital Government strategic goals and objectives. Change management is the basis for achieving the vision of the DGSF. This is the change that leads, manages, and enables enterprises to accept new processes, technologies, systems, structures, and values. It is the set of activities that helps enterprises transition from their present way of working to the desired way of working - the Digital Government's vision.



## DIGITAL GOVERNMENT PRINCIPLES

Principles used within the DGSF are intended to guide the building an integrated digital government for Tonga through appropriate change management where decision makings are based on evidences provided by correct data and information and a culture for determining, designing and managing of information systems as a core Government services. An example of this might be a principle of data and information sharing. Any new system or application should follow the basic principle of designing data with the expectation the data will be shared among different Government agencies, as well as open data made available to business and citizens. Of course, that also allows exception for data that must be protected consistent with privacy laws or protection of sensitive Government data.

The DGSF includes the following inter-connected and mutually re-enforcing basic principles that each information technology (IT) infrastructure project or information Systems (IS) project should consider prior to procurement:

- |                     |   |
|---------------------|---|
| 1) Security         | 6) Accessibility                            |
| 2) Connectivity     | 7) Customer Focus                           |
| 3) Interoperability | 8) Standardization                          |
| 4) Portability      | 9) Redundancy                               |
| 5) Innovation       | 10) Holistic (Whole of Government) Approach |

### Principle 1 - Security

This principle establishes a requirement that All IT planning should include assurances of Confidentiality, Integrity, and Availability with both information systems and physical data center and telecommunication systems.

Confidentiality is focused on ensuring privacy, or protecting citizens from unauthorized or inadvertent disclosure of their personal information to either unauthorized agencies – or into the general public. The international community has established a wide range of confidentiality controls, with the most recent being the European Union’s implementation of the General Data Protection Regulation (GDPR).

All applications and systems which collect or consume privacy-related data must be able to protect that information from disclosure outside of a legal “need to know.”

Integrity refers to the accuracy, timeliness, and completeness of information that is used internally, as well as shared with other agencies or the public. ISACA<sup>v</sup> provides criteria for ensuring the integrity and quality of data collected, stored, and consumed by an organization.

#### Information Quality Criteria

- Intrinsic Quality – the extent to which data values are in conformance with the actual or true values.
- Contextual Quality – The extent to which information is applicable to the task of the information user and is presented in an intelligible and clear manner, recognizing that information quality depends on the context or use.

- **Security and Accessibility** – The extent to which information is protected, available to those with a need to know, or obtainable to those with a need to know.

Each of the above criteria is further decomposed to provide additional guidance and criteria for Areas such as the accuracy, objectivity, interpretability, currency, completeness, relevancy, and disaster proofing of the data.

## **Principle 2 – Connectivity**

This principle establishes a requirement that will guarantee that the digital government infrastructure will be capable of supporting the delivery of e-solutions and e-services to all citizens with the assurance that no one will be left behind. Connectivity is a state of being connected or interconnected. In computing it is the capacity for the interconnection of platforms, systems and applications. “A generic term for connecting devices to each other in order to transfer data back and forth. It often refers to network connections, which embraces bridges, routers, switches and gateways as well as backbone networks<sup>vi</sup>”. The dissertation behind this principle is rooted within our consensus that e-government is about good governance in service delivery to all citizens using ICT. Therefore, the totality of e-government for all citizens can only materialize when all islands of peoples are digitally connected using ICT. In conclusion, government should ensure that all service providers, telecommunication carriers and ISPs are providing digital connectivity to all corners of all Islands in Tonga with the guarantee that all citizens are connected with the declaration that “Internet Access is Human Right”.

## **Principle 3 – Interoperability**

Governments should plan for interoperability as a basic principle for developing data and information systems for a number of reasons.

Digital Government interoperability leads to better decision-making. In most countries, policy makers are faced not only with overlapping and uncoordinated data sources but also with the absence of common terms of reference and means of representing these data. This results in the time consuming and complex cost of comparing data that is represented differently. Interoperability will allow data compiled by different agencies to be used together to make better decisions.

The second reason is that interoperability allows for better coordination of Government agency programs and services needed to provide enhanced services to citizens and businesses. If information about Government is easier to obtain, policy makers can design better projects and can more easily avoid redundant or similar projects. Furthermore, policy- and decision-makers would have more information by which to evaluate the performance of agencies and the public services they deliver.

The third reason is that interoperability is the foundation of a citizen-centric, one-stop delivery of services through a variety of channels. As noted by the UK Digital Government Unit, “better public services tailored to the needs of citizen and business require the seamless flow of information across Government.”

The fourth reason is that interoperability leads to cost savings and/or cost avoidance. By making systems ‘talk’ to one another, there may be no need for new systems that were once deemed necessary. Further, demanding interoperability breaks reliance on single vendors and yields choice for Governments in their purchases, upgrades and as they scale.



## **Principle 4 – Portability**

Data portability is the ability for people to transfer their data across interoperable applications, and across platforms. This includes the requirement to easily transfer data to a new system or application in the event and application is changed, updated, supplier terminated / changed, or interoperability of data or application is required.

An example of portability may be when planning disaster recovery and continuity of operations procedures or processes. Data and applications should be able to move between providers, different types of physical hardware, and be able to update in real or near real time.

Another important aspect of portability is ownership of data. Government agencies may choose to outsource some applications and data set creation or storage to an outside or third party; given the availability of cloud technologies which may offer security and efficiency benefits. The Government of Tonga will retain ownership of all national or country data produced either directly within Government owned and operated resources, as well as any data produced under contract or license by a third party, regardless of where those data are stored. That data must be available either via interoperable applications, or for transfer to a new system of an exit from outsourced provider, or specific proprietary application is necessary.

## **Principle 5–Innovation**

All Government IT systems should encourage innovative solutions focusing on enabling benefits, cost -effective IT solutions, and efficiency. Innovation requires maintaining an awareness of information technology and related service trends, identify innovation opportunities, and plan how to benefit from innovation in relation to Government ministry and agency business needs.

All IT solutions should consider opportunities for business innovation or improvement which can be created by emerging technologies, services, or IT-enabled business innovation, as well as through existing established technologies.

New systems should also support business and IT process innovation, external systems touch points (interoperability with other Government agencies). IT systems innovation may influence strategic business planning when the adoption of a new technology, use of technology, or integration of data would enable better or new decision support within one or multiple Government agencies – or be extended into private industry and to citizens.

## **Principle 6 – Accessibility**

As referred to earlier, these principles are inter-connected and inter-related and various context of accessibility has been presented in other principles such as in 'security' and 'customer focus'. In the context of this DGSF and in relation to the other principles, Principle 6 is supporting the Government to Public/People (G2P) services. It refers to the stream lining and efficiency of selected Government processes and workflows that provide public services and to ensure ease of the Public accessing these key services.

Information and communication technologies (ICT) accessibility barriers are systemic and reach all sectors of Government services and businesses. This principle recognises the accessibility barrier and calls for the development of ICT to be flexible enough to accommodate the needs and preferences of the broadest range



of users, regardless of the limitations of the ICT infrastructure while also considering the other principles of this framework. Five considerations in the design for accessibility with reasonable accommodation are important:

- **Content** is organized and presented appropriate to the interests, needs and preferences of end users;
- **Aesthetics** of the design accommodate the needs and preferences of diverse users;
- **Accessibility** of the design benefits all users as well as users with special needs;
- **Usability** of the design allows users to access, navigate, search and leave the information resource easily, intuitively and without barriers;
- **Sustainability** of the design is based on content management that affords flexibility to accommodate needs and preferences of diverse users.

## Principle 7 – Customer Focus

All Digital Government systems are designed to meet specific business requirements, with defined outcomes. Systems may be designed to meet Government to Government (G2G), Government to Business (G2B), or Government to Public (G2P) initiatives and requirements.

This requires IT planners and solutions architects to fully understand what provides value to Government and external stakeholders, whether it be in delivering better agility and innovation to Government agencies, or providing a better quality of life to citizens.

The quality of digital services the Government provides determines our reputation and trust as an institution. It profoundly affects the customer experience our citizens have in working for, and engaging with, the Government.

Customer-centric Government means that agencies respond to customer needs, making it easy to find and share information and accomplish important and routine tasks. It requires a high-standard ensuring timely data, relevant content, simplicity in transactions with the Government, and seamless (end-to-end) interactions with Government agencies that are easily accessible and understood.

The Government must strive to provide an “anytime, anywhere, on any device” environment when interacting with the Government. The world has become 24x7 hours per day, 365 days per year, is service-oriented, and technology-driven. Our citizens expect to be able to interact with websites, applications, marketplaces, and Government whenever it is convenient, without disrupting work, study, child care, or other life-critical activities.

## Principle 8 – Standardization

Standards provide agencies and innovators with a common language or platform that facilitates interoperability, simplifies transactions, and enables people to work together toward greater common goals that cut across agencies, disciplines, and even borders.

In the context of Tonga, standardization will include:

- IT Procurement
- Security Standards
- Common Applications
- Data Standardization (including single-source, authoritative data)
- Platform Standardization (including Cloud Computing, Data Center Consolidation, and Telecommunications)



- Process Standards

Referenced standards may include both formal international standards (e.g., ISO, NIST, IEEE, etc.), or locally developed standards unique to the Tonga environment. While each agency within the Government will have unique requirements and supporting applications / data, many applications such as office automation, finance, human resources, procurement, geospatial information systems, and document management can and should be standard across all agencies, with emphasis on using a single platform to support all agencies.

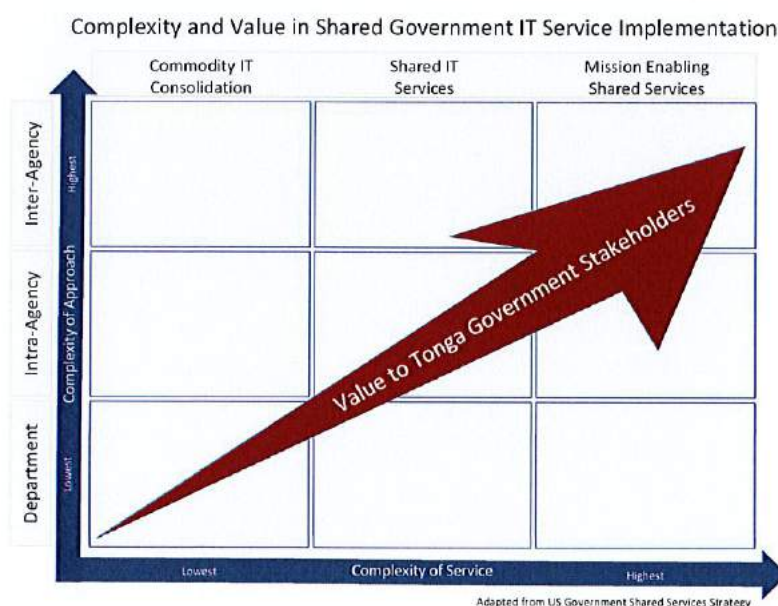
## Principle 9 – Redundancy

This principle establishes a requirement that will guarantee that the digital government e-services will be totally independent of the infrastructure that will support the delivery of e-solutions and eservices to all citizens with the assurance that no one will be left behind. In Engineering, Redundancy is the inclusion of extra components which are not strictly necessary to functioning, in case of failure in other components. "Network redundancy is primarily implemented in enterprise network infrastructure to provide a redundant source of network communications. It serves as a backup mechanism for quickly swapping network operations onto redundant infrastructure in the event of unplanned network outages<sup>vii</sup>."

The dissertation behind this principle is rooted within our consensus that e-government is about good governance in service delivery to all citizens using ICT. Therefore, the totality of e-government for all citizens can only materialize when there is a guarantee of minimal to no downtime of e-government services to citizens at any event whether it is natural disaster or manmade disaster. In conclusion, government should ensure that all service providers, telecommunication carriers and the distributed data centers are providing a redundancy mechanism in place to ensure that all e-government services are totally independent of the infrastructure in any unforeseen event of a natural or man-made disaster. Redundancy is also crucial for identifying Data Center Tier Levels Industry Standards.

## Principle 10 – Holistic (Whole of Government) Approach

All IT and Digital Government initiatives should acknowledge and be aware of potential impact on G2G, G2B, G2P touch points. As Tonga continues to develop additional Digital Government tools, such as National Enterprise Architecture and Interoperability Framework, greater governance processes and guidance will help Government agency leadership be aware of the impact any IT-related initiative will have both internally, as well as externally to Government, business, and to the public. A Holistic Government and Change Management Approaches will help solve the current silos of data within some



ministries and agencies which create data and information redundancy and fragmentation in Government. Change Management would guide organisations on how to manage faster, more complex, more interdependent and more cross-functional change than the DGSF recommended. Being able to deliver results on multiple changes allows an organization to achieve their strategic vision and thrive in today's changing landscape. Applying change management enables organizations to deliver results on each change more effectively and build competencies that grow the organization's capacity to tackle the changes required.

This approach will also enable and encourage different Government agencies to implement better information sharing as needed to facilitate Digital Government and service provision and reduce the burden on citizens in terms of running around different agencies to authenticate documents and clearances<sup>viii</sup>.

Tonga will use a phased approach implementing shared IT services, so a base of information, business, and technical systems interaction knowledge is developed between Government agencies, partners, vendors, and suppliers.



## DIGITAL GOVERNMENT STRATEGIC GOALS

Strategic goals are broad areas of change which may represent culture, technology, education, infrastructure, environment, efficiency, quality of life, or other potential long-term evolutions which may take many years to fulfill. Strategic goals will establish the “big picture” on how Tonga will move forward in establishing a Government information and communication technology (ICT) driven environment to create value for Government to Government (G2G), Government to business (G2B), and Government to people/public (G2P) technology-driven interactions.

The Digital Government and Information Architecture Principles described in the previous chapter provide a set of guidelines to help ensure successful National and Organizational Outcomes as listed in the TSDF, and Strategic Goals in the DGSF.

Strategic goals are supported with measurable and specific objectives, or organizational outcomes, which provide tasks needed to fulfill the goals. The DGSF provides a set of strategic goals aligned with the Tonga Strategic Development Framework (TSDF) focused on enabling the people of Tonga to reach their full development potential. .

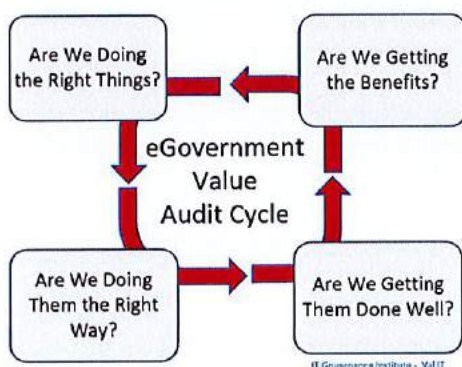
Objectives are also put into timelines, or schedules defining when a specific objective task is initiated and completed. The combined “calendar” of goals and supporting objectives will fit within the 5-year DGSF cycle.

Tonga's Digital Government Strategic Goals for 2019 – 2024 are:

1. Strengthen and Build Governance through Change Management
2. Implement Digital Government Across All Government Agencies and Activities
3. Advance Digital Inclusion for All
4. Promote Data Sharing and a Service-Oriented Information Systems Architecture
5. Enhance Public Engagement

Strategic goals are more generic and high-level than specific organizational outcome objectives. Strategic goals will all have to support the standard Government goals of creating optimal value from ICT-related

investments at a manageable cost, and an acceptable level of investment and operational risk.



Each of the above Strategic Goals is supported by several objectives, which provide the building blocks for accomplishing the Strategic Goals.

It is also necessary to fully understand the “triggers” and “pain points” Government agencies encounter in the course of business and be prepared to adapt the DGSF in annual or future iterations and updates of the strategic plan.

This approach will allow the Government more agility in determining the best direction for Digital Government projects, such as when a major technology shift, such as virtualization and cloud computing, offer clear benefits which may require a re-architecting of existing IT systems. Managing innovation is a critical component of any



governance framework, as without a culture of innovation, organization, including Government agencies, may lose the confidence of consumers (Government, Private Sector and Civil Society)

In cases where the Government does not have the resources to complete objectives, consideration will be given to establishing partnerships with Tongan domestic firms, international firms, foreign Governments, and non-Governmental or not-for-profit organizations which may provide the means to accelerate to fulfill objectives within the TGSF. For example, today the Tonga Secure Government Network (SGN) was constructed and is operated by Tonga Communications Company (TCC), as is the Government Consolidated Data Center.

If partnerships or outsourcing opportunities are considered, and the Government does not need to internally solve all Digital Government goals and objectives, then Government information systems managers and staff will be able to focus more time and resource on adding value to existing eServices and systems, while preparing for the implementation of new and future systems.

Additional areas of partnerships and cooperation may be in professional training, technical and engineering assistance, security monitoring, application and data integration, and development of policies adapted to Tonga based on international standards and best-practices.

In addition to helping accelerate successful outcomes to DGSF objectives, partnerships have a longer lasting benefit of providing skills, knowledge, expertise and experience, and the resources to further encourage change through business innovation. Technology and business triggers are a constant, and partnerships with resources capable of identifying, evaluating, informing, and aligning opportunities will bring additional tools to both consider change bringing additional value to the Government business, as well as address any pain-points or shortfalls in existing eServices within the Digital Government program.

Areas which may be addressed in future versions of the DGSF include Blockchain and the Internet of Things (IoT). For the 2019-2024 DGSF, such early stage developing technologies may not be feasible for adoption in the short term, but as each review of the DGSF is conducted, and strategic goals for education, standardization, and infrastructure provide a more capable and robust environment, those topics may become higher priorities and provide a basis for changing, adapting, or updating the DGSF.

### **Partnership and Outsourcing Risk**

Risk associated with partnerships and outsourcing arrangements vary, based on the nature of the relationship and delegation of operational responsibilities, as well as other areas such as ownership of information systems and data assets, service level agreements (SLAs), change management, and the availability and feasibility of a vendor or partner exit strategy.

Risk management for Digital Government systems require decisions based on several factors, including:

- Government Culture
  - Risk Tolerance, or the limits the Government sets on potential risk or risk scenarios
  - Risk Appetite, or the accepted amount of risk the Government is willing to accept under normal conditions
- Compliance and Regulations (e.g., Privacy, Data Sovereignty)
- Potential Impact of Loss Events



- Potential Impact of Failed or Non-Performing Projects

Based on the above factors, decision makers in agency business units, or at a policy level, can make risk decisions based on the following high-level options:

1. Risk Avoidance – Risk Avoidance is a decision made to discontinue or exit a project or program based on the belief the Government, partner, or outsourcing vendor cannot sufficiently protect a project, or operate a project. The Government determines the risk of loss or disruption to the Government and citizens is too high, cannot be transferred or shared, not cost-effective, and is unacceptable.
2. Risk Mitigation – The Government would implement controls or actions to avoid loss events, failure to perform, or as common in most information systems - security controls.
3. Risk Transfer or Risk Sharing – Risk Sharing means reducing risk by transferring or sharing a portion of risk. This is done when an organization may not have the resources, skills, or competences in a particular area such as project management, operations, security, or other required component of program and project development. Standard forms of Risk Sharing include insurance, partnerships, and outsourcing.
4. Risk Acceptance – do nothing and accept the risk

For the Tonga Digital Government program, initial and continuing risk management, analysis, review, and decision making is critical. There are many international standards and best practices available to use as reference in managing Digital Government-related risk. Those include (not limited to):

- ISO 31000 / ISO 20000 / ISO 27005 (ISO Risk Mgt Standard)
- NIST SP 800-30/37/39 (Guide for Conducting Risk Assessments)
- MoR Framework (Mgt of Risk Framework - UK Government OCG)
- COBIT5 for Risk
- COSO ERM (Comm of Sponsoring Orgs of the Treadway Commission)

Tonga will develop and implement risk management within all Digital Government activities adapted to the Tonga environment based on one or more of the above standards (Goal 3) and (also refer Attachment B).

## GOAL 1 –STRENGTHEN AND BUILD GOVERNANCE THROUGH CHANGE MANAGEMENT

Governance refers to the establishment of policies, and continuous monitoring of their proper implementation, by the members of the governing body of any organization, including Government. Governance includes mechanisms needed to balance the powers of organizational leadership with their primary duty of enhancing the prosperity and viability of the organization.

With all governance models the primary objectives are for the Government to create value for Tongan stakeholders through creating benefits for the citizens, reducing or optimizing risk in national investments and programs, and optimizing or creating the most value from national resources, including ICT-related investments.

Specific eGovernance objectives are reviewed by and approved by the eGovernance Steering Committee. The steering committee is staffed by representatives from different ministry and agency stakeholders.

eGovernance adds ICT-enabled capabilities to the traditional process of organizational governance. With the implementation of ICT in the governance process, reporting and monitoring functions within the governance process becomes much more accurate and timely.

### Explaining eGovernance

eGovernance is the transformation of Government to provide efficient, convenient and transparent services to citizens and businesses through Information and Communication Technology (ICT).

*"eGovernance, however, is not really the use of IT in governance but as a tool to ensure good governance.*

*eGovernance does not mean proliferation of computers and accessories; it is basically a political decision which calls for discipline, attitudinal change in officers and employees, and massive Government process re-engineering"*

(ISIM, "From eGovernance to Open Governance")

Those capabilities may be described as "governance enablers," which according to ISACA may include:

- Principles, National Policies, and ICT Frameworks
- Formal and mature functional processes
- Organizational structures (such as consolidation of data centers and ICT management)
- Culture, ethics, and behavior (as appropriate for Tonga)
- Data and Information
- Services, Infrastructure, and Applications
- People, Skills, and Competencies

eGovernance supports a standard governance model, which will include:

- Ensuring alignment of the Digital Government Strategic Plan with other ICT plans, the TSDF, and stakeholder business strategies
- Ensure commitment of executive management within Ministries and Government Agencies for making ICT-related decisions
- Ensuring adequate principles, policies, directives, and other needed guidance are in place to develop implementation and governance processes

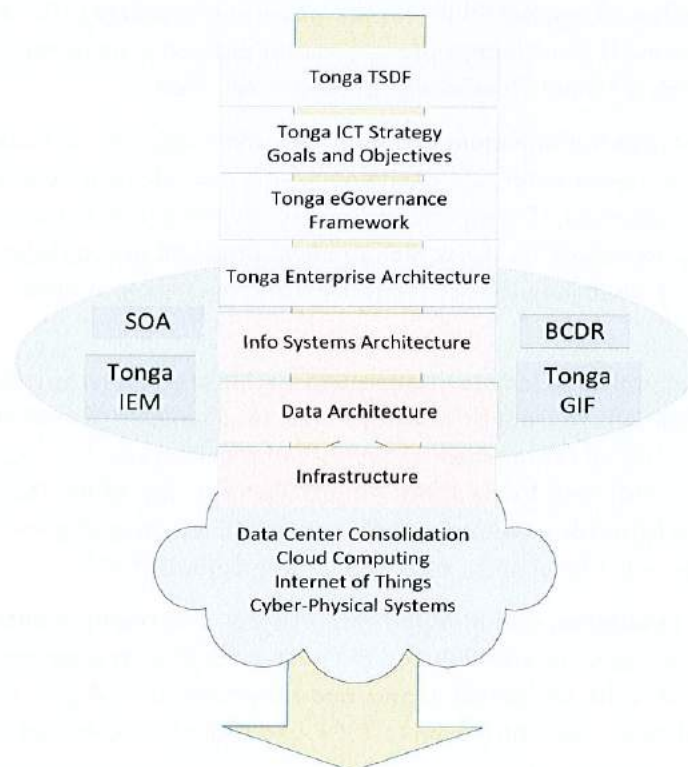


- Ensure the delivery of ICT services is in line with stakeholder requirements, and expectations
- Measuring Digital Government performance against expected outcomes

All the above goals and high-level supporting objectives will be backed by data-driven processes, which will also include utilities to direct the structured implementation of IT systems, reporting on performance, and monitoring outputs to ensure compliance with governing policies and regulations.

Additional support for the eGovernance process will be through the use of the Tonga Enterprise Architecture, Information Exchange Model, Interoperability Framework, Continuity of Operation Plan (COOP/BCDR), and other related policies as presented in Figure 5 below.

**Figure 5: eGovernance Integrated Frameworks**



All supporting Digital Government policies, architectures, frameworks, and standards will support the entire strategic guidance stack, as shown in the above figure. Those items are discussed further in Strategic Goal 4 - Data Sharing and a Service-Oriented Information Systems Architecture.

## Goal One Objectives

Digital Government requires online or electronic digital public services that are inclusive by default for the widest possible audience (universal design), accommodating a broad range of needs and abilities - including the elderly and citizens with disabilities, delivered locations in the country which may not currently have access to Internet.

Digital Inclusion also requires our citizens to have the skills and knowledge needed to fully navigate Digital Government services. This will require additional formal Government programs to ensure students and adults have access to digital literacy skills development.

Digital inclusion is a holistic approach, aware that increasing the readiness of citizens and businesses in using eServices and programs requires development of specialized training for citizens and business.

- 1.1 **Establish an Digital Government governance model.** ICT Governance models and frameworks are becoming a standard requirement among Governments. Most Governments are adopting, and adapting, frameworks based on ISO 38500 and/or ISACA's COBIT5. The extent of adoption or modification is dependent on the scope of Digital Government activities.
- 1.2 **Ensure all required policies, legislation, and regulations are in place as needed to ensure full commitment and delegation of responsibility for the governance process.** This also requires the assignment of authority to the IT Governance process, and a defined organizational structure, and definition of the roles which a formal Governance process is required.
- 1.3 **Establish and maintain a risk management program.** Risk management will focus on optimizing risk for all Government internal and other external stakeholders. The main domains within IT risk management include IT benefits and enablement, IT program and project delivery, and IT operations and service delivery. The expected outcomes of the IT risk management program are to reduce the probability and consequences of any event which may impact Tonga Digital Government systems, infrastructure, or services.
- 1.4 **Establish Digital Government Architectures (Enterprise Architecture, Interoperability Framework, SOA, Information Exchange Model).** To meet basic governance requirements of evaluating, directing, and monitoring (EDM) ICT and Digital Government activities and planning requires supporting information systems architecture, standards, and frameworks. An architectural view of the Digital Government environment establishes a basis for governance functions (EDM), including alignment of Digital Government systems and infrastructure with Government of Tonga strategic goals (TSDF).
- 1.5 **Establish eGovernance evaluation and monitoring processes and requirements.** Engage with Government agency stakeholders to establish and maintain a monitoring approach to define the objectives, scope and method for measuring impact and effectiveness of Digital Government performance, service delivery, and contribution to TSDF and Digital Government objectives.
- 1.6 **Implement eGovernance training program for all levels of management.** Effective governance requires knowledge in the structure and implementation of the governance process. There are several governance certification programs, such as the ISACA Certified in the Governance of Enterprise IT (CGEIT), and formal governance training in COBIT5, a globally recognized framework in governance, risk, and compliance. All agency IT managers and business will benefit in formal awareness training and education in governance concepts and process.
- 1.7 **Ensure Information Systems compliance with all Tonga and International law and regulations, including privacy and protection of national information.** Most IT systems are dependent at some level on external factors such as privacy laws, environmental laws, security, safety, and in some cases international laws and regulations. All Digital Government information systems must be in compliance with all Tongan laws and regulations relative to Government Information and Communications Technology.



## GOAL 2 –IMPLEMENT DIGITAL GOVERNMENT ACROSS ALL GOVERNMENT AGENCIES AND ACTIVITIES

Digital Government comes in many different forms, ranging from the digitization of paper records and processes, to the automation of all Government processes and public services. Digital Government is a prerequisite to other Digital Government Strategic Goals, as without digitization of data, interoperability, automation of services, and information sharing is not possible.

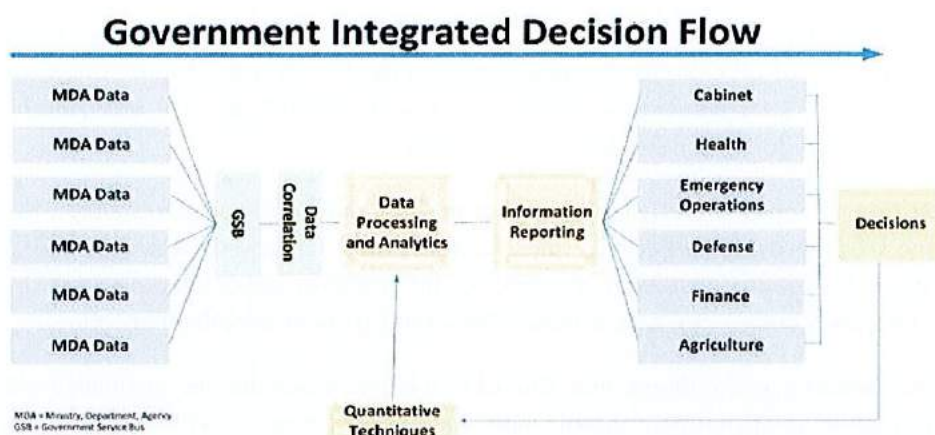
Information systems require robust underlying infrastructure, including data center resources, applications, and communications. The DGSF provides objectives which establish an IT infrastructure architecture, including the need for data center consolidation, transition to standardized virtual or cloud computing resources, disaster recovery facility with backup resources, and a secure Government communication network.

As the infrastructure objectives are fulfilled, then Digital Government development activities will focus on creating value in Government information systems supporting Government workflows, processes, and expected National or Organization Outcomes.

The DGSF acknowledges that it is difficult to quickly change the processes and media that has supported the country for many years in the past. It also acknowledges that technology-driven “triggers” present many opportunities to improve accuracy of Government and public data, reduce the lag of Government and public services, and enable new services and efficiencies.

The Tongan Government will strive to adopt an “Information-Centric” approach, focusing on creating and storing accurate, relevant, timely, and secure data which can be used as input to better processes and decision support.

Figure 6 Government Decision Making Flow



Data created by one agency should be available, as needed, and as passes security and need to know, to other agencies for their decision making or workflow process. Under the Cabinet are the enterprises, ministries and agencies level. A few is listed in Figure 6. The list on the far right are examples of any of the government agencies or Ministries. At a digital level, all data collected by agencies, including future Internet of Things (IoT) data, should be associated with meta data and published in an online catalogue which all agencies can review to determine the availability of existing single-source, authoritative data.

With digitization of existing processes, and collection of lot and other unstructured data, the Government will further establish a means and architecture for supporting the principles of interoperability and openness, making data assets available (when passing checks for a “need to know” and security) for use within agencies, between agencies, and whenever possible access extended to the private sector, or extended to citizens.

This approach will reinforce the principle of focusing on customer needs, whether internal to the Government, or to private industry and citizens. Putting the customer first means quality information is accessible, current and accurate. It also means coordinating across agencies to ensure citizens can easily interact with Government information and services, find the information they need, and complete transactions with the Government at a level of efficiency equal to their experiences interacting with the private-sector.

**The key enabler for Digital Government is an established common platform.** This platform is composed of many different components, ranging from the physical underlying infrastructure needed to operate Digital Government services, to applications and data systems which provide Digital Government automation and citizen or business interaction with Government. Those components include (not limited to):

- Government Secure Telecommunications Network (GSN)
- Centralized Government Data Center
- Government Cloud Computing



- Common Information Systems Enabling Utilities
- Common, Cross-Agency Applications
- Disaster Recovery and Continuity of Operations
- One Stop Customer Support Center

## Goal Two Objectives

The main desired outcome from the Tonga Digital Government Goal is to provide information and services that users need, both Government and citizen, delivered anytime, anywhere, and through the most efficient, effective, and responsive and responsive method / platform possible.

- 2.1 Transform and simplify the way Government does business through digitization, innovation, and automation of Government processes.** Digital Government relies on data in a digital format. Digitized data accelerates data transitions to information, and actionable knowledge for decision makers, as well as formatting inputs into reports or documentation needed by citizens and business. The digitization process will be driven by a Tonga Government Digital Services Implementation Plan, which will guide the digitization transition for all Government agencies.
- 2.2 Replace paper-based forms with online forms.** Paper-based forms have many shortfalls, ranging from the need for physical archives to maintain paper records, to inhibiting automation of Government workflows and processes. Citizens, private industry, and Government agencies should be enabled to create inputs to Government processes, and receive outputs from processes from any location, at any time, as needed to perform actions needed to interface with Government.
- 2.3 Transition existing data sets from flat files, spreadsheets, and word processing documents into data base and tabular data.** Data and Information have little value if it is not available. Digital Government is based on the premise that Government processes and workflows will have real-time access to historical data, "in-motion data," and cross-agency data as input to reporting, decision support, and predictive analytics. Data and information contained in individual files or a format that is not accessible to decision support and reporting will dilute the accuracy and validity of decisions.
- 2.4 Establish a platform for electronic payments.** The world is moving towards digital currencies. This will be more apparent as millennials and younger generations bring their exposure and adoption of online services into their professional and personal lives. Government and the private sector will find the ability to adopt digital payments available anytime, or anyplace via the Internet an expected part of their present and future plans, providing much greater payment efficiencies, better documentation, greater accuracy, and timeliness in their interactions with Government.
- 2.5 Transition all Government agencies to Secure Government Network (SGN).** Tonga's Ministries and agencies currently connect to each other, and internally within the agency, using public Internet services. This presents high operational and security risks by not having a communications technology standard, standard vendor service agreements, as well as security risks from exposing Government data to the public Internet. The SGN will also allow much better end-user performance allowing implementation of more efficient, innovative applications and services.
- 2.6 Develop a National Digital Government Security Standard.** Digital Government Security must comply with National Security Standards to ensure the Confidentiality, Integrity, and Availability of data and services for all citizens, business, and Government agencies.

**2.7 Extend the Digital Government platform to all Government offices, public education facilities public health care facilities, and public safety facilities throughout the country by 2024.** All agencies which create data, analyze data, refer to data and information, or use data for decision making must be connected to the GSN. The GSN is the conduit connecting Government agencies to the national data centers, standardized cloud computing resources, and common applications needed to create a fully integrated ICT utility needed to support Digital Government.

**2.8 Establish a single web portal to provide a “Single Window” to access all Government services.** Accessing Government services will be both intuitive, and simple, to accelerate adoption by all users within the Government and private sector. This is done through a fully integrated Single Window, or Web Landing Page, which will guide all users to their desired service or information source.



## GOAL 3 –ADVANCE DIGITAL INCLUSION FOR ALL

According to the National Digital Inclusion Alliance (NDIA)<sup>ix</sup>, Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of Information and Communication Technologies (ICTs).

Digital Literacy, a component of Digital Inclusion, is further defined as “*the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.*”

A digitally literate person, according to NDIA, will:

- Possesses the variety of skills – technical and cognitive – required to find, understand, evaluate, create, and communicate digital information in a wide variety of formats;
- Is able to use diverse technologies appropriately and effectively to retrieve information, interpret results, and judge the quality of that information;
- Understand the relationship between technology, life-long learning, personal privacy, and stewardship of information;
- Use these skills and the appropriate technology to communicate and collaborate with peers, colleagues, family, and on occasion, the general public; and
- Use these skills to actively participate in civic society and contribute to a vibrant, informed, and engaged community.

### 3 Aspects of Digital Inclusion

- ACCESS: Availability and Affordability, Design for Inclusion and Public Access
- ADOPTION: Digital Literacy
- APPLICATION: Workforce Development, Education, Health Care, Public Safety, Civic Engagement, Social Connections

Digital Inclusion Survey

Tonga recognizes the rapid advancement of countries around the world in adopting and developing new technologies, and absorbing those capabilities into day-to-day life. For the people of Tonga to take full advantage of the potential of not only Digital Government services, but also have the intellectual and technology tools to compete in a technology-driven global economy, Tonga must set digital literacy and digital inclusion as national priorities.

It is also clear that simply providing financial support to educational institutions and Government agencies will not successfully meet the challenges of either digital literacy or digital inclusion. Both require long term planning for in many cases changing the culture, individual perceptions of the value of information technology, and most important ensuring that our younger generations are not inhibited by a “the digital divide” which if Tonga is not competitive, our young will not be able to realize the potential a rapidly advancing global economy reliant on a highly educated and capable workforce.

Digital literacy is not exclusive to the general public. In a 2017 survey conducted by ISACA<sup>x</sup>, only 53% of business leaders believed they were digitally literate, having a solid understanding of technology, and the potential benefits and risks of employing technology.

*“Organizations with digitally literate leadership are more open to taking risks, more clearly see the benefits of emerging technologies, and are more likely to initiate pilots to thoroughly vet these technologies.”*

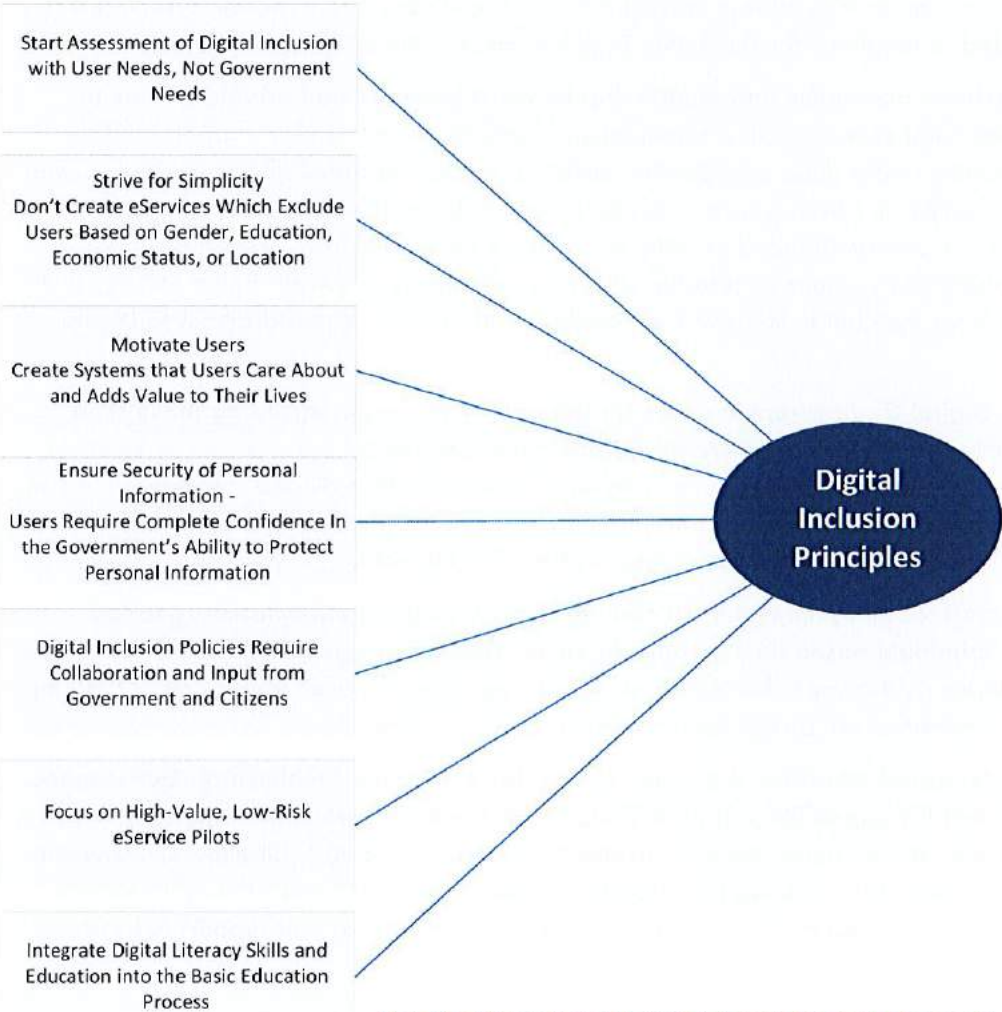
While digital literacy is not synonymous with technical knowledge or expertise, having a solid understanding awareness of the potential benefits technology triggers and innovations may bring to Government will further enable ministry and agency leadership to make informed, risk aware decisions on how to implement and exploit information systems for the benefit of their organizations and end users – both Government and the public.



Goal Three Objectives

Digital Government requires online or electronic digital public services that are inclusive by default for the widest possible audience (universal design), accommodating a broad range of needs and abilities - including the elderly and citizens with disabilities, delivered locations in the country which may not currently have access to Internet.

Digital Inclusion also requires the people of Tonga to have the skills and knowledge needed to fully navigate Digital Government services. This will require additional formal Government programs to ensure students and adults have access to digital literacy skills development.



Digital inclusion is a holistic approach, aware that increasing the readiness of citizens and businesses in using eServices and programs requires development of specialized training for the general public and business.

- 3.1 **Ensure affordable mobile or wireless Internet access, at a minimum, is available to all Tongans by 2021.** All Digital Government services, by their nature, require Internet access to take advantage of service benefits. This is also considered enabling infrastructure for all Digital Inclusion initiatives in Tonga, regardless of use in connecting to Government services, or for all other business and quality of life activities.
- 3.2 **Incorporate digital literacy skills development into all educational programs by 2021** establishing basic levels of digital literacy needed for school graduates to successfully enter the workforce. As an approach in education curriculum design, digital literacy and digital skills needed for students and for the public to participate or compete in the digital world. Gaining exposure and knowledge in digital skills in school will also have the continuing impact of providing the tacit knowledge and experience required to gain multi-literacy needed to function throughout their lives in work, quality of life, and security.
- 3.3 **Provide citizen and business assistance and mentorship to assist business and private sectors in accessing Digital Government services** with a combination of intelligent call centers, support kiosks in remote locations, and service center desks at individual ministries or agencies serving citizen needs. Lower income people and communities in under-served areas and vulnerable communities, or who have not been afforded the opportunity to gain digital literacy skills, must not be prevented from accessing Digital Government services. While the younger generation will bring their newly acquired digital literacy skills to the home, all citizens have the right to improve their quality of life through assured access to Digital Government services.
- 3.4 **Ensure accessibility to Digital Government services for the people of Tonga, including those with disabilities.** A process must be in place to ensure all citizens can access Digital Government services via Internet connections using personal computers, smart phones, or Government-provided resources, it is also important to ensure citizens with disabilities can take advantage of eServices by expanding service interfaces to accommodate citizens with mobility, visual, and audio limitations.
- 3.5 **Establish policies for information systems and citizen eServices which are all inclusive, gender neutral, and do not discriminate based on economic or social status.** Demographics must not contribute to a "digital divide" which would favor individuals in a specific demographic over others when accessing or attempting to access eServices. All citizens have the right to equal access.
- 3.6 **Promote adult and professional education programs to develop Enterprise Architecture, Governance, and management-oriented ICT capabilities.** Digital Government is not a technical planning and management process, rather it is a framework and architecture which if executed will allow Government to be more efficient, and better serve the needs of Tonga's citizens. Professional education will promote better alignment between Government Ministry and agency business objectives and support ICT systems and infrastructure.



## GOAL 4 –PROMOTE DATA SHARING AND A SERVICE-ORIENTED INFORMATION SYSTEMS ARCHITECTURE

Most organizations will classify data and information as two of the most valuable assets the organization can manage. The value of that data or information increases when data is input into decision support systems, allowing Government agencies to make faster and more accurate decisions based on single source authoritative data, possibly from several different agency sources, supporting business processes and producing actionable outcomes.

Traditionally, Government of Tonga Agencies only focused on supporting internal business processes with independent systems, often with proprietary formats and system interfaces. The result was that each Government agency worked within “information silos,” where data and information was not directly available to other agencies which needed to input cross-agency data. Examples may include be Government human resources, finance, customs, health, and others which depend on cross-agency information flow to make effective decision.

The strategic goal of data sharing and a service-oriented information system architecture (SOA) will look at a range of methods to create business process efficiencies, greater decision-making capability and accuracy, and reduce the cost and complexity of information systems.

The implementation of shared services in the Government of Tonga will enable Government agencies to adopt shared approaches to service delivery across agency mission, support, and IT commodity areas. A “Shared-First” approach to ICT resources by Government agencies will improve business process performance, increase return on ICT investment, and possibly most important - promote innovation.

By adopting shared data and information system services, agencies may further eliminate duplication of ICT cost structures, reduce risk, accelerate procurement of resources and services, implement new capabilities, and innovate in a rapid and cost-efficient manner.

To achieve these goals, agencies must be aware of available shared services, resources, and platforms so the agencies will include consideration for shared services in their individual strategic and investment planning processes – in addition to the objectives added in the DGSF.

### **Impact of Data Center Consolidation and Cloud Computing on Digital Government**

As Government of Tonga Ministries and Agencies begin the transition into a centralized, consolidated data center, using a private Government cloud computing environment, additional benefits and tools will help accelerate development and deployment of integrated Digital Government services.

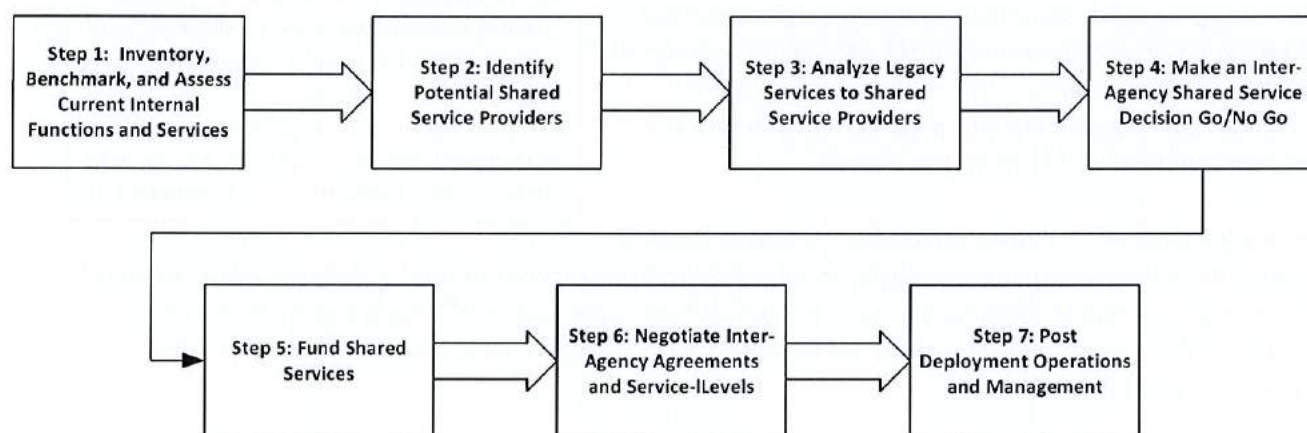
The consolidated environment will provide a common standard for many applications, such as geospatial information systems, document management, databases, and information flow, including the implementation of a Government Enterprise Service Bus to help interconnections and facilitate automation of

A major benefit implementing a SOA is information systems agility. Rather than focusing all efforts on individual applications, the focus is directed towards the value of data. Once the source, format, location, and semantics of agency data is understood, Government business processes can be more effectively designed, applications selected, and principles of data sharing complied with.

*“A service-oriented architecture (SOA) is a style of software design where services and data are provided to the other system components by application components, enabled through a communication protocol over a network. Communications between systems are most commonly completed via an enterprise service bus (ESB), which facilitates access to services and data by connecting services with a need to know, and successful authentication and authorization.*

*The basic principles of service-oriented architecture are independent of vendors, products and technologies. A service is a discrete unit of functionality that can be accessed remotely and acted upon and updated independently, such as the Ministry of Finance retrieving a customs declaration statement online.”*

Government of Tonga Ministries and agencies should always go through a basic decision process when considering a new or updated IT system to determine potential external touch points. This includes systems and data directly produced or collected by the originating agency, data required from other agencies, and data locally produced which is needed for export or to be made available to other agencies.



### Shared Service Implementation Decision Steps

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The Tonga Enterprise Architecture Framework(EAF) will help Government of Tonga agencies better understand the process and expected outcomes of designing any information system. The EAF will also help support the fundamental principle of designing systems which are whole of Government aware.

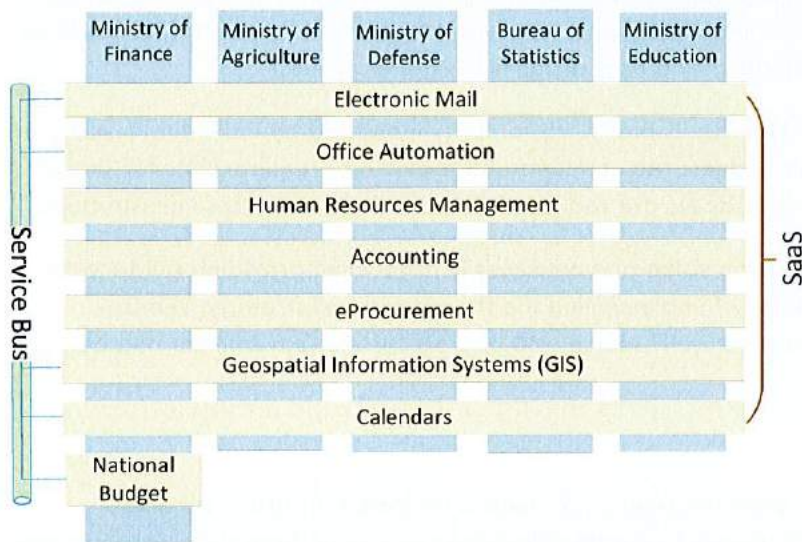
As noted, many governance ministries and agencies continue to operate independent data center server rooms or small Data Centers. To be most effective, this shared services and Service-Oriented architecture strategy will also encourage ministries and agencies to decommission small and mostly end of life resources



and transition their existing applications, data, and communications infrastructure to a consolidated and centralized Government data center facility.

In addition, the Consolidated Data center environment will also offer all Government agencies cloud computing resources and interconnection or interoperability tools. The Consolidated Data center will also ensure disaster recovery and continuity of operations for Government agencies for use of the backup data center environment.

However, it is understood that many Government agencies will need to go through the transition process to make their IT environment ready for consolidation. For many IT managers there is a perception that transitioning into a Consolidated Data center, or even cloud resource, will result in security shortfalls or loss of control.



Ministry and agency leadership within the Government of Tonga must be aware of, and support, the DGSF, shared services strategy, or it is unlikely individual ministries and agencies will enthusiastically adopt a shared services strategy or SOA.

Adopting a shared services strategy requires executive support at the Minister and CEO level of each Ministry and agency. A centralized Ministry, such as MEIDECC, cannot be expected to drive or set the culture for other line ministries and agencies, but can ensure other executive leadership understands the value of a shared services and SOA strategy, and the risk of not supporting the strategy. Questions we can ask when preparing to embark on the shared services journey may include<sup>xii</sup>:

- Does a sponsor or champion exist within the Ministry or Agency who is willing to lead the transition to a shared services environment and SOA? What is their level of involvement and commitment?
- Are there multiple user groups or Government business areas, internally and externally within the agency, impacted by the transition?
- Is the organization ready to give up the “we are unique” point of view?
- Is there agency leadership to push organization sub-units to get onboard?
- Have end users and stakeholders been involved in considering the change?



- Have specific resistance issues and concerns been documented and addressed by the transition team?
- Do technical resources exist to plan and execute the transition; and if not, can they be obtained?
- Has funding been committed (or is it available) to cover the transition costs?
- What is required of MEIDECC, a vendor, or third party to ensure a successful transition to the shared service?
- Does a strategic communication plan exist to ensure that all stakeholders are informed engaged in the transition process?

By far the most difficult barrier impacting Government agencies when adopting shared services is the impact to organizational culture. Many Government agencies hold on to a perception that previous business models, while not perfect, satisfied their specific agency mission processes and day-to-day operations. Delivering services in a standardized, shared services environment may require organizational and operational changes for employees, new workflows and processes to understand, new training requirements, potential loss of some degree of autonomy or responsibility, or even retraining or reassignment into new roles.

There may also be a centralization but some IT budgets that were formerly managed by individual ministry or agency ITE managers. This will change as the business requirements and technology requirements for shared services environments are identified, and some budgets are reallocated to the shared services infrastructure.

Executive sponsors must always keep the long-term vision and outcomes in mind when providing guidance to their organizations and employees. The benefits of implementing the shared services strategy, service-oriented architecture, and standardized infra-structure resource, will pay off for the Government and business or citizens stakeholders in the future.

## Goal Four Objectives

The data sharing and SOA requirement for Tonga Information Systems is the core supporting all other components of the TSDF, ICT Strategy, and necessary to create efficiencies and value from data collected and consumed by Tonga Government ministries, agencies, and citizens.

Objectives include not only data identification and availability, but also incorporate standards for common applications, platforms, and processes.

- 4.1 Develop and Implement a Tongan Government Enterprise Architecture Framework.** The Government will establish a common information systems architecture consisting of business process, information, data, application and technology architecture layers for effectively and efficiently realizing Government and IT strategies by creating key models and practices that describe the baseline and target architectures.
- 4.2 Implement a Data Center Consolidation Program.** Data Center Consolidation will create a better security environment, standardization of ICT resources, reduce operational risk, in addition to providing financial, operational, and operational efficiency benefits.
- 4.3 Complete an inventory of all Government Ministry and Agency Applications and Databases.** As part of the data center consolidation initiative and cloud computing transition, it is important to inventory all ICT in use by the Government. This is for several reasons. First, to understand what data is being collected and stored by each Government agency. Second, to create an initial demand analysis and forecast for



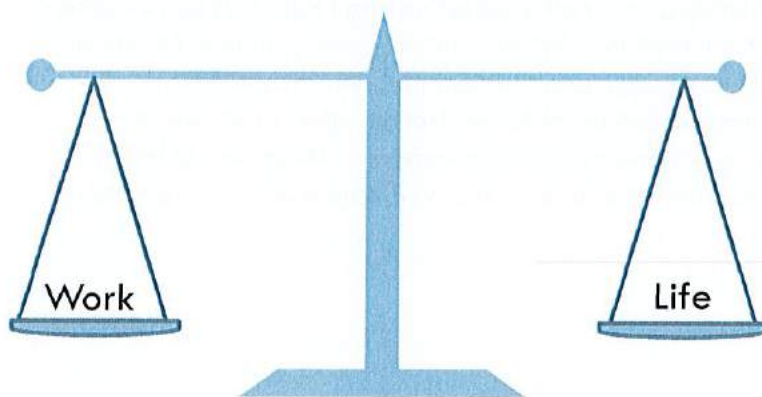
managing the cloud resource pool and communications capacity. Third, to identify sources of security risk in existing IT systems.

- 4.4 Develop and Implement Tongan Government Cloud Computing Transition.** Cloud computing provides Tonga Government agencies with a pool of virtual compute and storage resources, common IT utilities and applications, with a greater ability to support information sharing and interoperability, disaster recovery, resource efficiency, portability of data and information systems, and provides the potential for greater IT security.
- 4.5 Develop and Implement a Tongan Government Interoperability Framework (GIF).** The Government Interoperability Framework establishes the guidance for data sharing within Government information systems. This includes identifying potential protocols establishing the taxonomy for data interchange between Government agencies as needed to support a Government service-oriented architecture.
- 4.6 Establish a method for agencies to interconnect data, application processes, and workflows via a Government Service Bus.** The Government(enterprise) service bus (ESB) provides a standard platform for data interchange between Government agency information systems.
- 4.7 Establish common applications access and catalogue for all applications and data services common across Government agencies** (e.g., Geospatial Information Systems, eProcurement, Finance, Document Management, Office Automation (email, word processing, presentation, data visualization, etc.)). Government agencies will standardize on common, interoperable applications when available, or possible. Standardized applications provide many benefits to the Government. Those include better vendor service-level agreements, volume purchasing agreements, improved data sharing, more efficient training and skills development, and support.

## GOAL 5 –FACILITATE PUBLIC ENGAGEMENT

The Government of Tonga recognizes that the public, private sectors, NGOs and communities are rapidly moving into the Digital Age, with nearly most Tongans equipped with mobile devices, exposure to Internet-enabled content, services, entertainment, and introduction of technology into the class room. All future generations will have digital technologies integrated into their lives, and expect Government to perform at the same level as the private sector.

The DGSF is not a short-term vision and plan. Rather, the DGSF looks at the current state of Digital Government capabilities in Tonga, and prepares a longer term strategy to build a *responsive, timely and robust Government's decision making through change management focused on improving the efficiency and effectiveness of Government services thus enabling a competitive business environment and to create sustainable development opportunities for the people of Tonga.*



In a digital world, physical location is not as important as having communications access, open data, and access devices. Equipped with digital access tools, such as mobile smart phones, computers, and laptops, citizens will have access to a continually expanding list of Digital Government services, allowing citizens to recover valuable time currently spent waiting in line for access to basic or routine Government services.

While a primary focus of the DGSF is citizen access to Digital Government services, a parallel benefit will be greater access to both technology and information resources provided to citizens and business. This benefit may take the form of either stimulating entrepreneurship, new industries, and less Government overhead burdens to small businesses.

In our context, citizens represent a broader category of Digital Government users and stakeholders which include Tongan citizens, residents, and visitors to the country.

Some of the objectives supporting the strategic goal of improving the quality of life for the people of Tonga will include topics such as:

- Single-window web landing page for the Government with links to all Digital Government services
- Enhanced Digital Government Channels
- Improving and simplifying Digital Government user experiences
- Greater user uptake of eServices
- Developing eServices user interfaces with mobile applications as part of all designs
- Expanding Digital Government Customer Support



- Improving citizen privacy
- Continually increasing the number of eServices Deployed, with an effort to enable those services for “Always On” availability
- Improving customer satisfaction in Government processes
- Stages of life services
- Developing improved channels for business and public feedback
- Developing public and business Digital Government Awareness programs
- Providing incentives for public use of Digital Government services
- Information, interaction, and contact access to all Government ministries and agencies, with and emphasis on providing an alternative to existing manual processes for use of web-enabled forms and automated workflows
- Full integration of “Stages of Life” events into Digital Government services
- Incorporate social media into the communications and information plan to promote public and business interactions with the Government.

## **Goal Five Objectives**

Enhancing public engagement goals are intended to reduce the negative impact of Government interactions on the public but to enable greater efficiencies in Government interactions, and enable the public and business to establish a better relationship with Government as primary external stakeholders to the Government process.

It is reasonable to assume the more time a person or business representative must spend queued in line waiting on manual processes, filling out forms, collecting documentation, and in some cases traveling to different cities or islands to complete basic Government interactions both inhibits productivity, as well as creating frustration with the Government bureaucracy.

Our people have daily interaction with family members outside of Tonga, travel abroad, and access to entertainment which in many cases highlights the potential of adopting a strong Digital Government program focused on improving people's quality of life, and greater confidence in Government.

All objectives supporting the Strategic Goal of Enhancing Public Engagement are dependent on the Government fulfilling objectives in strategic goal 4, requiring interconnection and interoperability among all Government agencies, providing a potential for process and workflow automation to enable more efficient, effective, and valuable resources for citizens and business.

Adopting all quality of life initiatives is a challenging prospect. This requires a major shift and transition in policy, culture, and processes. While some basic public services can be identified as easier to implement, others will require major re-architecting of the data structures, workflows, and data or information sharing policies.



- 5.1 **Establish an authentication base for electronic signatures for use in public and business transactions or interaction with Government agencies.** At an individual level this might be tied to the National ID Project.
- 5.2 **Develop and implement ePayment systems for all Government-related transactions** requiring payment by publics and business, including tax payments, registration payments, services fees, and all other transactions. Individuals should not be required to travel to Government offices and queue in line to make payments for Government services. An ePayment system will allow a combination of payment cards (ATM/Credit) and kiosks to allow the public and business payments without the burden of being required to pay in person.
- 5.3 **Develop and implement web-enabled processes for all routine public and business to Government transactions and interactions** (e.g., requesting Government services, business registration, requesting documents from Government agencies, etc.). This is a long term activity, as the integration of workflows and process automation will require in many cases re-architecting of data and information systems. It is important to identify and implement some public and business interaction workflows that are simple, with high value and lower risk characteristics. This will help develop experience, enthusiasm, and add quicker value to prospective G2G, G2P, and G2B interactions.
- 5.4 **Establish digital, irrefutable standardized records for all births, deaths, marriage, and divorce.** Digitization of personal lifecycle events is necessary to provide public with the protection of personal lifecycle records, and allow an easy method of providing assurance that records are accessible when needed – and disaster proof. Special care and consideration is needed to ensure the Confidentiality, Integrity, and Availability of personal identifiable information (PII) is protected.
- 5.5 **Establish and implement web portal and services access for the public** with support for mobile (smart phone), wireless (WiFi), and fixed line Internet. G2C and G2B interactions with Government services must be accessible from any accepted media or device. Not everyone has access to all networks and devices. Development of access devices, and access networks will continue to evolve with introduction of new technology triggers, and more affordable devices. All services will be formatted to support the access method or device used, further enabling inclusion of citizens and business to facilitate electronic interaction with the Government.
- 5.6 **Establish and implement land management system** with irrefutable records of ownership, geospatial data, zoning information, and linkage to structural data (buildings, water, power, telecom lines, roads) records. As with Objective 5.4, digital records of land ownership, usage, and management are critical to ensure not only protection of landowners, but also to ensure planning, construction, and development of Tonga's valuable resources is conducted with the best possible, and precise information.
- 5.7 **Establish and implement electronic voting.** All citizens entitled under Tongan law have the right, and obligation to vote. In locations or circumstances where it is not possible to show in person at a polling station, or for ensuring accuracy in vote counting, electronic voting with highly secure authentication and authorization will enable better citizen representation in elections.
- 5.8 **Establish and implement an eProcurement system** allowing business and the public greater visibility and transparency in Government contracting and bidding. Automation of Government procurement will allow business and the public greater access to Government contracts, bids, and enhance transparency of the bidding process through structured eProcurement interfaces.



**5.9 Incorporate social media into the communications and information plan to promote publics and business interactions with the Government.** Social media has become the common channel for communications from Government to the general public and business. Social media allows for both near real time interactions, as well as real time streaming communications. Social media plans and policies will provide value to agency leaders, as well as feedback and information collection from citizens.

## SUMMARY

The Tonga Digital Government Strategic Framework provides a guidance for Government ministries and agencies to benefit from investments in information and communications technologies, trading value not only for their own agency, but also for cross Government agency, external touch points to private enterprise, and to the people of Tonga.

Closely aligned with the Tonga Strategic Development Framework, the DGSF is based on five strategic goals and supporting objectives. Each strategic goal and objective supports multiple national and organizational outcomes as listed within the TSDF.

The DGSF relies on the digitization of information and data to provide the basis for more efficient process automation, interagency workflows, with the intent of improving the cost and efficiency, and utility of Government information and decision support systems.

The DGSF is not intended as a technical guide or technical direction for individual ministries and agencies. Rather, the DGSF establishes objectives to help guide the often complex requirements to develop data and information systems, and to make the most value of data created, stored, and used within a single agency, or preferably across multiple agencies.

Additional architectures and frameworks required within the DGSF, such as, in enterprise architecture, data interoperability framework, and a Tonga information exchange model will help facilitate the integration and interchange of data across agencies.

The Public and business will greatly benefit from the DGSF as objectives are initiated and completed. All objectives as completed will provide additional positive multiplying impacts for each agency with a requirement to either export or consume data or information from other agencies. This is the concept of a Service-Oriented information systems architecture.

Areas of great concern such as personal privacy, security, disaster recovery and continuity of operations, and data protection and sovereignty are all a high priority within the DGSF. While the DGSF is not prescriptive for selecting technologies, individual standards, or international best practices, all are taken into consideration when making specific policy or regulatory decisions which will impact the implementation and operations of ICT within Tonga.

The eGovernance structure provides a system of stakeholder requirements transformed into national and organizational objectives and outcomes, and delegation of responsibility for operationally fulfilling those objectives and outcomes. The eGovernance structure then provides defined measurements, whether key performance indicators, key success factors, or compliance, all ICT activities within the Government must meet objectives as directed by stakeholders and parliament.

The DGSF 2019-2024 provides this direction for all Government agencies and is provided as informational guidance for private industry and for all the people of Tongan.



## ATTACHMENT – A

### TSDF ALIGNMENT

The Tonga Strategic Development Framework sets the strategic goals and objectives for the entire country.

The top-level mission for Government is to enable “*a more progressive Tonga supporting a higher quality of life for all.*”

The vision of development for Tonga is established with two definitions driving “Inclusive Development” and “Sustainable Development.”

#### Inclusive Development

*“Growth and development that allows all the people of Tonga to contribute to, and benefit from the attainment of our National Outcomes and National Impact and so enhance our Inheritance.”*

#### Sustainable Development

*“Development that meets the needs of the present, without compromising the ability of future generations to meet their own needs, this is development that enhances our inheritance and passes it on improved.”*

Those development domains have seven National Outcomes, which are:

1. A more inclusive, sustainable and dynamic knowledge-based economy
2. A more inclusive, sustainable and balanced urban and rural development across island groups
3. A more inclusive, sustainable and empowering human development with gender equality
4. A more inclusive, sustainable and responsive good-governance with law and order
5. A more inclusive, sustainable and successful provision and maintenance of infrastructure and technology
6. A more inclusive, sustainable and effective land administration, environment management, and resilience to climate and risk
7. A more inclusive, sustainable and consistent advancement of our external interests, security and sovereignty

The National Outcomes have a supporting set of five pillars which are further broken into specific set of actionable objectives as follows:

#### Pillars with Organizational Objectives

1. Economic Institutions
  - 1.1 Improved macroeconomic management and stability with deeper financial markets
  - 1.2 Closer public/private partnership for economic growth
  - 1.3 Strength and business enabling environment
  - 1.4 Improved public enterprise performance
  - 1.5 Better access to, and use of, overseas trade & employment, and foreign investment

2. Social Institutions

- 2.1 Improved collaboration with, and support to, civil society organizations and community groups
- 2.2 Closer partnership between Government, churches, and other stakeholders for community development
- 2.3 More appropriate social and cultural practices
- 2.4 Improved education and training providing lifetime learning
- 2.5 Improved Health Care in delivery systems (universal health coverage)
- 2.6 Stronger integrated approach is to address both communicable and non-communicable diseases
- 2.7 Better care and support for vulnerable people, in particular the disabled
- 2.8 Improved collaboration with the Tonga diaspora

3. Political Institutions

- 3.1 More efficient, effective, affordable, honest, transparent and apolitical public service focused on clear priorities
- 3.2 Improved law and order and domestic security appropriately applied
- 3.3 Appropriate decentralization of Government administration with better scope for engagement with the public
- 3.4 Modern and appropriate constitution, laws and regulations reflecting international standards of democratic processes
- 3.5 Improved working relations and coordination between privy council, executive, legislative & judiciary
- 3.6 Improved collaboration with development partners ensuring programs that are aligned behind Government priorities
- 3.7 Improved political and defense engagement within the Pacific and the rest of the world

4. Infrastructure and Technology

- 4.1 More reliable, safe and affordable Energy Services
- 4.2 More reliable, safe, affordable transport services
- 4.3 More reliable, safe and affordable information and communication technology (ICT) used in more innovative ways
- 4.4 More reliable, safe and affordable buildings and other structures
- 4.5 Improve use of research and development focusing on priority needs based on stronger foresight

5. Natural Resources & Environment

- 5.1 Improved land use planning, administration and management for private and public spaces
- 5.2 Improved use of natural resources for long-term flow of benefits
- 5.3 Cleaner environment with improved waste recycling
- 5.4 Improved resilience to extreme natural events and impact of climate change

While technology is listed as a single input pillar, the reality is each of the institutional and input pillars will rely on technology and Digital Government as an essential component of each outcome, goal, and National Outcome.

Examples of this direct Digital Government relationship are clear in Institutional Outcome objectives, such as Economic Institutions Outcome 1.1:



*“Improved macroeconomic management and stability with the development of a stronger, deeper, more inclusive financial system to ensure sound macro-economic environment within which inclusive and sustainable business and social opportunities can be developed and pursued.”*

The DGSP Strategic Goals include:

1. Improve Digital Government
2. Facilitate Digital Inclusion
3. Strengthen Governance and Efficiency
4. Enable Data Sharing and Service-Oriented Information Architecture
5. Enhance Citizen Engagement

Within the DGSP, Goals 1,2,3,4,5 are all enablers supporting achievement of this required National Outcome.

Another example may be within the pillar “Political Institutions,” under Organizational Outcome 3.5:

*“Improved working relations and coordination between the Privy Council, Executive, Legislative & Judicial wings of Government so that they work effectively together in support of the Tongan vision.”*

In this example, DGSP Goals 1,3,4,5 all have supporting objectives which will act as enablers to achieving this National Outcome.

Each DGSP Strategic Goal and supporting objectives will all be aligned with the TSDF, supporting one or more National Outcome, and in some cases an objective may be directly aligned to all National Outcomes, such as the case of Improving Digital Government, improving eGovernance, and Enabling Data Sharing and Service-Oriented Information Systems Architecture.

## ATTACHMENT - B

### GOALS AND OBJECTIVES SCHEDULE AND REFERENCE

This matrix establishes both timelines, and cross reference to National Outcomes, Organizational Outcomes, and Pillars as listed within the Tonga TSDF. The timelines establish the year in which each objective should be completed. With an annual review of the DGSF all performance indicators are reviewed and if needed completion time lines adjusted.

National Outcome – NO

Organizational Outcome – OO

Pillars - P

Strategic Goal		Objectives	Completed By	TSDF Reference
Strengthen and Build Governance through change management	1.1	Establish Digital Government governance model	2020	NO-D, P-3
	1.2	Ensure all required eGovernance policies, legislation, and regulations are in place	2021	NO-D, P-3
	1.3	Establish a Risk Governance program	2020	NO-D/E, P-4
	1.4	Establish Digital Government Architectures (Enterprise Architecture, Interoperability Framework, SOA, Information Exchange Model)	2020	NO-D/E, P-3/4
	1.5	Establish eGovernance evaluation and monitoring processes and requirements	2020	NO-D/E, P3/4
	1.6	Implement eGovernance training program for all levels of management	2022	NO-D/E, P-3/4
	1.7	Ensure Information Systems compliance with all Tonga and International law and regulations, including privacy and protection of national information	2023	NO-D/E/G, P-1/2/3/4
Digital Government	2.1	Transform and simplify the way Government does business through digitization, innovation, and automation of Government processes using the Tonga Government Digitation Plan.	2024	NO-D/E, P-3
	2.2	Replace paper-based forms with online forms.	2022	NO-D/E, P-4
	2.3	Transition existing data sets from flat files, spreadsheets, and work	2022	NO-D/E, P-4



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		processing documents into data base and tabular data.		
	2.4	Establish a platform for electronic payments.	2020	NO-A/D/E, P-1/2/3/4
	2.5	Transition all Government agencies to Secure Government Network (SGN).	2020	NO-E, P-4
	2.6	Develop National Digital Government Security Standard.	2020	NO-D/E, P-4
	2.7	Extend Digital Government platform to all Government offices, public education facilities public health care facilities, and public safety facilities throughout the country	2024	NO-E, P-4
	2.8	Establish a single web portal to provide a "Single Window" to access all Government services.	2010	NO-A/C/E
Digital Inclusion	3.1	Ensure mobile or wireless Internet access, at a minimum, is available to all Tongans by 2024	2021	NO-E, P-2,4
	3.2	Incorporate digital literacy skills development into all educational programs by 2020, establishing basic levels of digital literacy needed for school graduates to successfully enter the workforce.	2020	NO-A/C/E, P-1/2/3/4
	3.3	Provide public and business assistance and mentorship to assist citizens in accessing Digital Government services with a combination of intelligent call centers, support kiosks in remote locations, and service center desks at individual ministries or agencies serving citizen needs.	2021	NO-A/C/E, P-1/2/4
	3.4	Ensure accessibility to Digital Government services for all citizens, including those with disabilities.	2022	NO-A/C, P-1/2
	3.5	Establish policies for information systems and citizen eServices which are all inclusive, gender neutral, and do not discriminate based on economic or social status.	2020	NO-A/C, P-2/3/4
	3.6	Promote adult and professional education programs to develop Enterprise Architecture, Governance, and management-oriented ICT capabilities	2021	NO-A/D/E/F/G P-1/3/4
Data Sharing / SOISA	4.1	Develop and Implement a Tongan Government Enterprise Architecture Framework	2019	NO-A/B/D/E/F, P-3/4
	4.2	Implement Data Center Consolidation Program	2019	NO-E, P-4

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	4.3	Develop and Implement Tongan Government Cloud Computing Transition	2023	NO-E, P-4
	4.4	Complete an inventory of all Government Ministry and Agency Applications and Databases	2021	NO-D/E, P-3/4
	4.5	Develop and Implement a Tongan Government Interoperability Framework	2021	NO-A/B/D/E/F, P-3/4
	4.6	Establish a method for agencies to interconnect data, application processes, and workflows via a Government Service Bus	2021	NO-D/E/F, P-3/4
	4.7	Establish common applications access and catalog for all applications and data services common across Government agencies (e.g., Geospatial Information Systems, eProcurement, Finance, Document Management, Office Automation (eMail, word processing, presentation, data visualization, etc.)	2023	NO-A/B/D/E/F, P-3/4
Enhance Citizen Engagement	5.1	Establish an authentication base for electronic signatures for use in citizen and business transaction or interaction with Government agencies.	2021	NO-C/D/E, P-1/2/3/4
	5.2	Develop and implement ePayment systems for all Government-related transactions requiring payment by citizens and business, including tax payments, registration payments, services fees, and all other transactions	2021	NO-C/D/E, P-1/2/3/4
	5.3	Develop and implement web-enabled processes for all routine citizen and business to Government transactions and interactions (e.g., requesting Government services, business registration, requesting documents from Government agencies, etc.)	2024	NO-C/D/E, P-1/2/3/4
	5.4	Establish digital, irrefutable standardized records for all births, deaths, marriage, and divorce	2024	NO-C/D/E, P-1/2/3/4
	5.5	Establish and implement web portal and services access for citizens with support for mobile (smart phone), wireless (WiFi), and fixed Internet	2021	NO-A/C/E, P-1/2/4
	5.6	Establish and implement land management system with irrefutable records of ownership, geospatial data, zoning information, and linkage to structural data (buildings, water,	2024	NO-B/D/E/F, P-1/2/3/4/5



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		power, telecom lines, roads) records		
	5.7	Establish and implement electronic voting	2023	NO-D/E, P-2/3/4
	5.8	Establish and implement eProcurement system allowing business and citizens greater visibility and transparency in Government contracting and bidding	2021	NO-D/E/G, P-1/2/3/4
	5.9	Incorporate social media into the communications and information plan to promote citizen and business interactions with the Government.	2010	NO-A/C, P-2/3

<sup>i</sup> 2018 Cabinet Decision

<sup>ii</sup> Prime Minister's Reform Task Force Methodology, Government of Tonga

<sup>iii</sup> California Enterprise Architecture, Digital Government (eGov) Reference Architecture (RA), California Department of Technology, Version 1.0, January 2, 2014

<sup>iv</sup> *ibid*

<sup>v</sup> "Enabling Information," ISACA, COBIT 5, 2013

<sup>vi</sup> Connectivity Definition from PC Magazine Encyclopedia

<https://www.pcmag.com/encyclopedia/term/40241/connectivity> 2

<sup>vii</sup> [https://en.wikipedia.org/wiki/Right\\_to\\_Internet\\_access](https://en.wikipedia.org/wiki/Right_to_Internet_access) 3

<https://www.techopedia.com/definition/29305/network-redundancy> 4

<https://www.telehouse.com/2016/05/identifying-data-center-tier-levels-guide/>

<sup>viii</sup> In the US Shared Services Strategy, for example, consolidating commodity IT services across agencies provided an immediate opportunity which helped build the momentum needed to implement more complex shared information systems services in critical mission and support areas, such as emergency management and procurement-Federal Information Technology Shared Services Strategy, Office of the President, 2012

<sup>ix</sup> <https://www.digitalinclusion.org/definitions/>

<sup>x</sup> "Digitally Literate Leaders are Essential for Business Transformation," ISACA November 2017

<sup>xi</sup> "Federal Shared Services Implementation Guide," CIO Council (US), 2013

<sup>xii</sup> *ibid*

